

What is claimed is:

1. A fine particle film comprising a substrate and plural number of protein fine particles which are arranged on the surface of said substrate in a plane direction parallel to the surface of said substrate,

wherein each of said protein fine particles has plural number of first binding sites and one or more second binding sites respectively comprising a condensed amino acid,

each of said first binding sites binds to other first binding site carried by an adjacent fine particle,

said second binding site binds to said substrate, and

at least a part of the condensed amino acids constituting said second binding site are substituted.

2. The fine particle film according to claim 1 wherein at least a part of the condensed amino acids constituting said second binding site is a basic amino acid.

3. The fine particle film according to claim 2 wherein said substrate is negatively charged.

4. The fine particle film according to claim 1 wherein at least a part of the condensed amino acids constituting said second binding site is an acidic amino acid.

5. The fine particle film according to claim 4 wherein said substrate is positively charged.

6. The fine particle film according to claim 1 wherein said plural number of protein fine particles are arranged regularly on the surface of said substrate.

7. The fine particle film according to claim 1 wherein each of said protein fine particles has a symmetric axis.

8. The fine particle film according to claim 7 wherein said symmetric axis is a four times symmetric axis.

9. The fine particle film according to claim 7 wherein said symmetric axis is a three times symmetric axis.

10. The fine particle film according to claim 7 wherein said symmetric axis is a twice symmetric axis.

11. The fine particle film according to claim 1 wherein each of the first binding sites carried by adjacent two fine particles binds via an ionic bond.

12. The fine particle film according to claim 10 wherein each of the first binding sites carried by adjacent two fine particles binds via an ionic bond with a cation which is divalent or more multivalent being sandwiched therebetween.

13. The fine particle film according to claim 1 wherein said protein is apoferritin or CCMV protein.

14. A process for producing a fine particle film comprising a substrate and plural number of protein fine particles which are arranged on the surface of said substrate in a plane direction parallel to the surface of said substrate,

wherein each of said protein fine particles has plural number of first binding sites comprising a condensed amino acid, and each of the first binding sites binds to other first binding site carried by an adjacent fine particle,

said process comprising: generating a second binding site in each of said protein fine particles by substituting a part of the condensed amino acids constituting each of said protein fine particles with a basic amino acid; and

making said substrate bind to said second binding site by bringing said protein fine particles into contact with a negatively charged substrate.

15. A process for producing a fine particle film comprising a substrate

and plural number of protein fine particles which are arranged on the surface of said substrate in a plane direction parallel to the surface of said substrate,

wherein each of said protein fine particles has plural number of first binding sites comprising a condensed amino acid, and each of the first binding sites binds to other first binding site carried by an adjacent fine particle,

said process comprising: generating a second binding site in each of said protein fine particles by substituting a part of the condensed amino acids constituting each of said protein fine particles with an acidic amino acid; and

making said substrate bind to said second binding site by bringing said protein fine particles into contact with a positively charged substrate.

16. A process for producing a fine particle film comprising a substrate and plural number of protein fine particles which are arranged on the surface of said substrate in a plane direction parallel to the surface of said substrate,

wherein each of said protein fine particles has plural number of symmetric axes, and

each of said protein fine particles has plural number of first binding sites comprising a condensed amino acid, and each of the first binding sites binds to other first binding site carried by an adjacent fine particle,

said process comprising: selecting a specified single symmetric axis among said plural number of symmetric axes by generating a second binding site in each of said protein fine particles through substituting a part of the condensed amino acids constituting each of said protein fine particles with a basic amino acid; and

making said substrate bind to said second binding site by bringing said protein fine particles into contact with a negatively charged substrate.

17. The process for producing a fine particle film according to claim 16

wherein said second binding site is located on said specified single symmetric axis.

18. The process for producing a fine particle film according to claim 16 wherein said protein is apoferritin or CCMV protein.

19. A process for producing a fine particle film comprising a substrate and plural number of protein fine particles which are arranged on the surface of said substrate in a plane direction parallel to the surface of said substrate,

wherein each of said protein fine particles has plural number of symmetric axes, and

each of said protein fine particles has plural number of first binding sites comprising a condensed amino acid, and each of the first binding sites binds to other first binding site carried by an adjacent fine particle,

said process comprising: selecting a specified single symmetric axis among said plural number of symmetric axes by generating a second binding site in each of said protein fine particles through substituting a part of the condensed amino acids constituting each of said protein fine particles with an acidic amino acid; and

making said substrate bind to said second binding site by bringing said protein fine particles into contact with a positively charged substrate.

20. The process for producing a fine particle film according to claim 19 wherein said second binding site is located on said specified single symmetric axis.

21. The process for producing a fine particle film according to claim 19 wherein said protein is apoferritin or CCMV protein.